Introduction to Computer Graphics

Section 1 : http://bit.ly/1IVF9aG
Sheet 1 : http://bit.ly/1mXsSWC

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Creativity :D

Creativity :D

How to install OpenGL

http://cacs.usc.edu/education/cs596/ogl_setup.pdf

Question 2:

What is the Computer Graphics and how it's different from Image Processing?
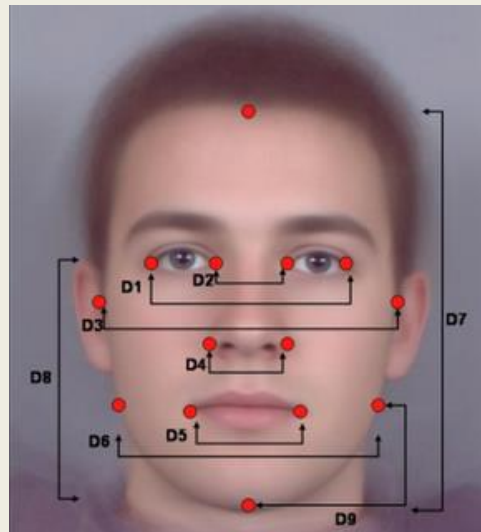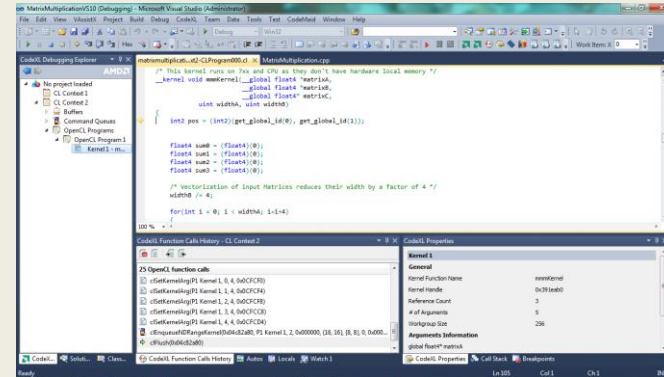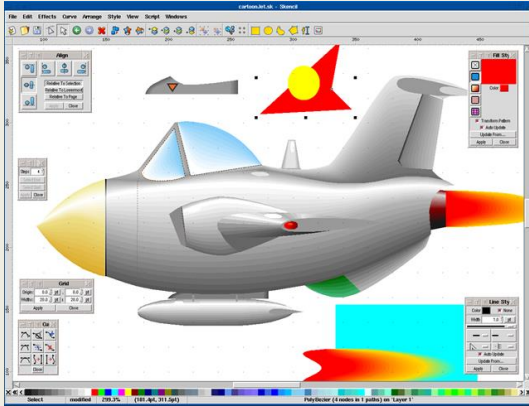

Computer Graphics

VS

Image Processing

Answer 2:

Computer Graphics:

- concerning with all aspects of **<u>producing</u>** pictures or images using a computer.
- It specifically deals with images/pictures **<u>produced</u>** using programs
  - Writing a program in a general purpose language to produce an image
  - Using a graphics software package to draw an image

Answer 2:

Image Processing

1. Acquiring images using cameras (or other sensors)
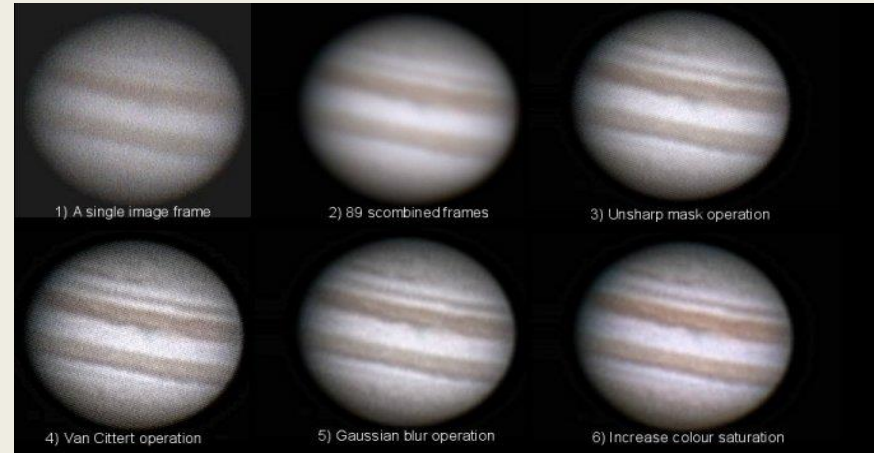   - Digital Camera
   - Xray

Answer 2:

Image Processing
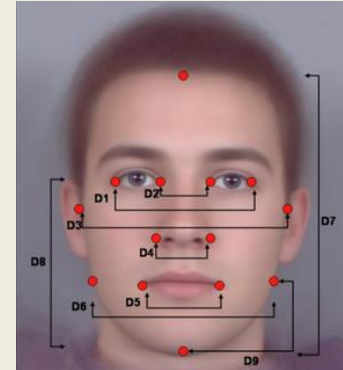
2. Manipulating it using the computer
- Enhance the image
- Gray scale

1) A single image frame   2) 89 scombined frames   3) Unsharp mask operation
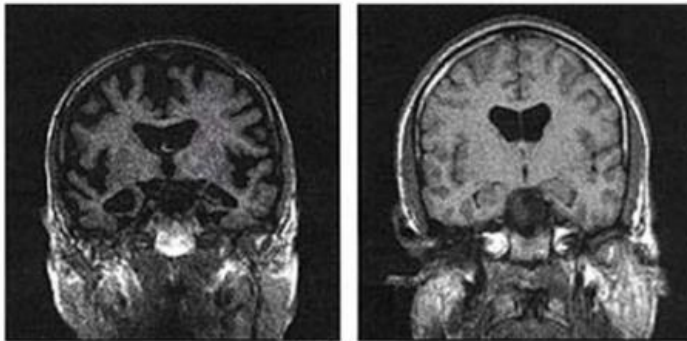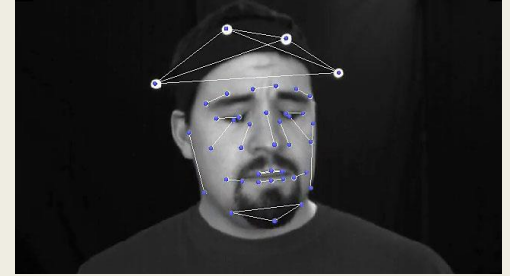4) Van Cittert operation   5) Gaussian blur operation   6) Increase colour saturation

Answer 2:

Image Processing

3. Find some characteristics or patterns in the image
- o Face recognitions
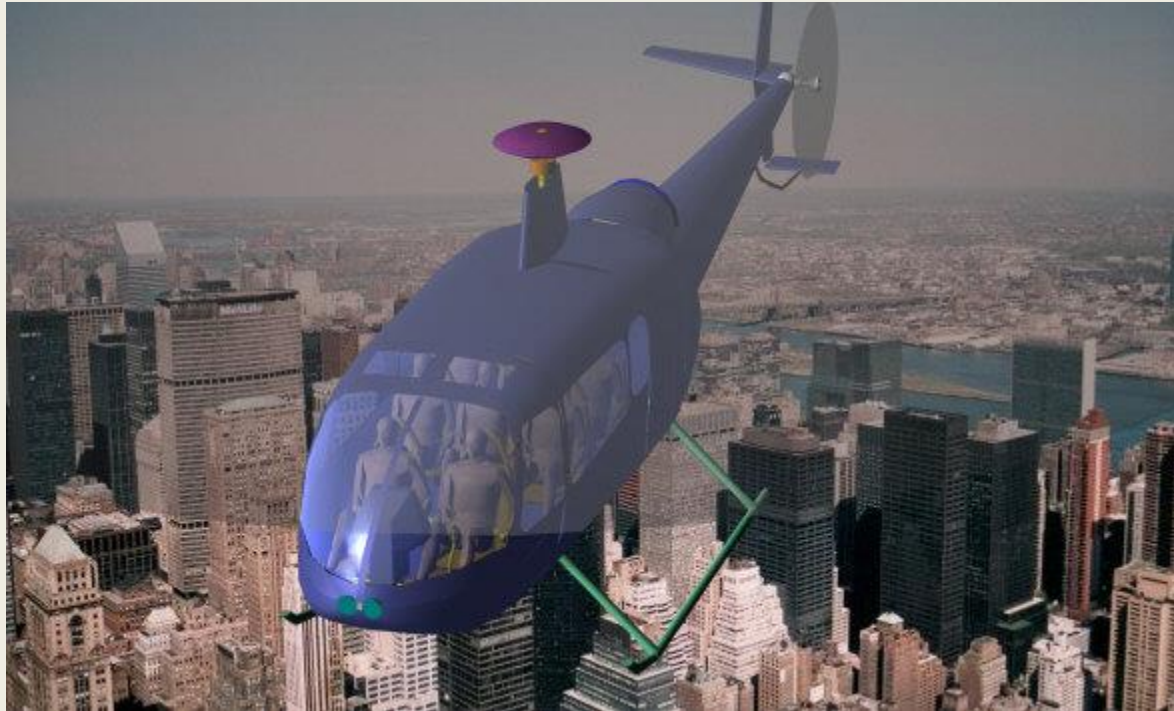- o Disease detected

Questions :

Computer graphics or Image Processing ?
1. Detect your face when you upload a picture on facebook ?
2. Creating character for a computer game ?
3. Manipulate a picture on the photoshop ?
4. design a web site on the photoshop ?
5. take a selfie ?
6. draw a great drawing on a white paper ?
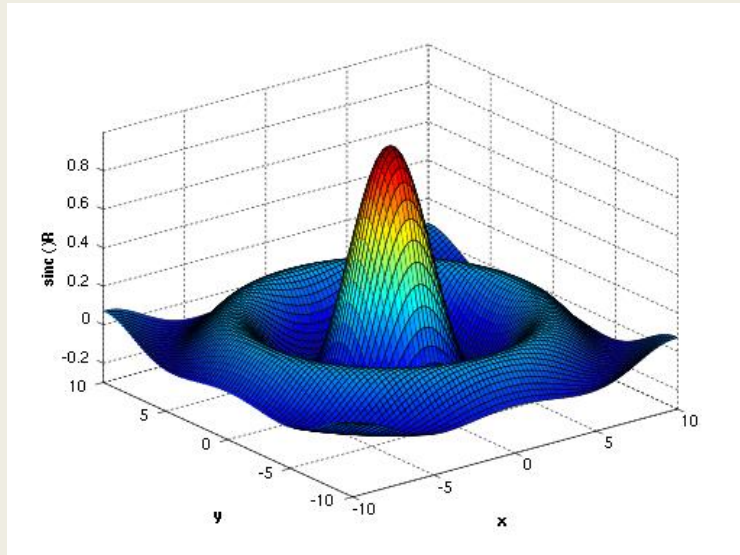
Question 3:

Mention some application areas of computer graphics ?

Answer 3:

1. Display of information:

Visualize the numerical data to determine them easily

Answer 3:

2. The human visual system is <u>unrivaled**</u> as a pattern recognizer. We can employ computer graphics with that fact to convey information to human in learning, illustrations and presentations of materials so aiding viewers in understanding information (Information visualization)**
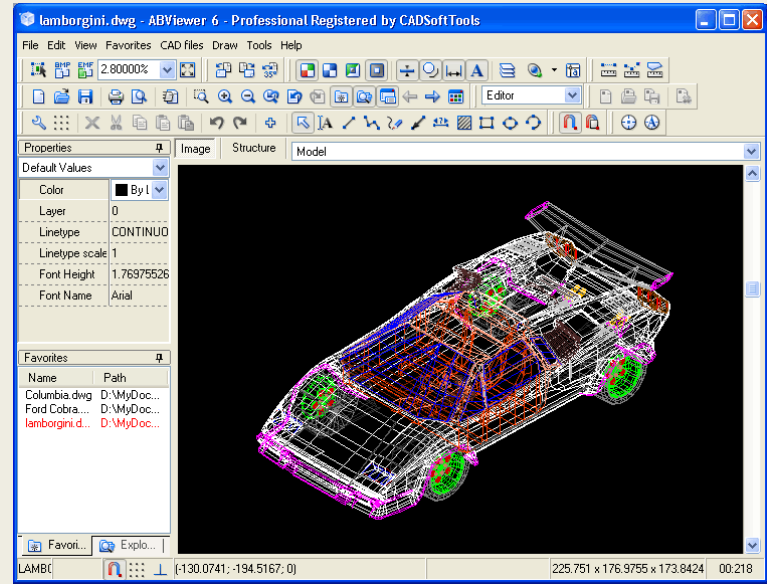
Answer 3:

3. Design(CADs systems)

Computer-aided design (CAD) is the use of computer systems to assist in the creation, modification, analysis, or optimization of a design.

- Design Cars
- Design Towers
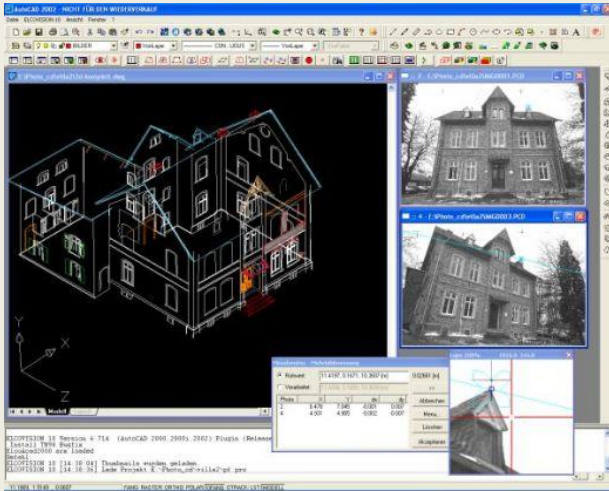
Answer 3:

4. Simulation and modeling (ex. Graphical flight simulator: real time graphics production,games, VR).

- Simulate dangerous experiments
- Make Model for future use
- Make a video game :D

Answer 3:

5. User interfaces
- Easy dealing with the computer

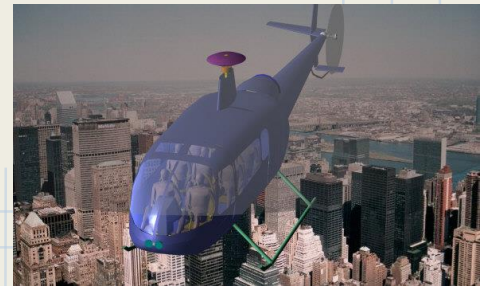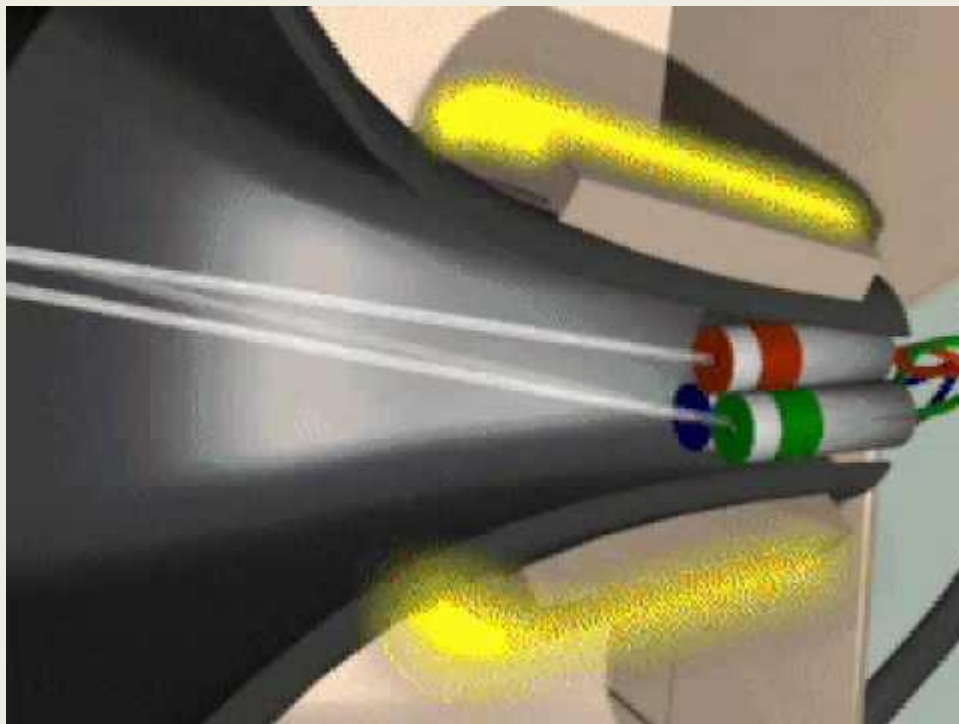# Question 4:

Explain why images are better displayed than text on CRT monitors ?

Before Answer 4:

Answer 4:

- By nature, the illumination of the phosphor dots on the CRT monitors change **gradually** from pixels to the **adjacent pixel** compared to the somewhat abrupt change on LCD monitors.
- This causes the gradual changes in color between the image pixels that gives the required **smoothness** of the picture.
- The same characteristic make the text appears more better on the LCD monitors since the **abrupt** changes makes the text clear.
- This in addition to some other factors like the dependency of the view quality on the viewer angle on LCD and high illumination on CRT monitors

Question 5:

We can generally classify graphics utilities and libraries in two main types:
- Two dimensional drawing utilities and libraries
- Three dimensions utilities and libraries that utilizing scene/viewer/projection model

Explain the main differences between the two types in stressing the role of the graphics creator when using each of them ?
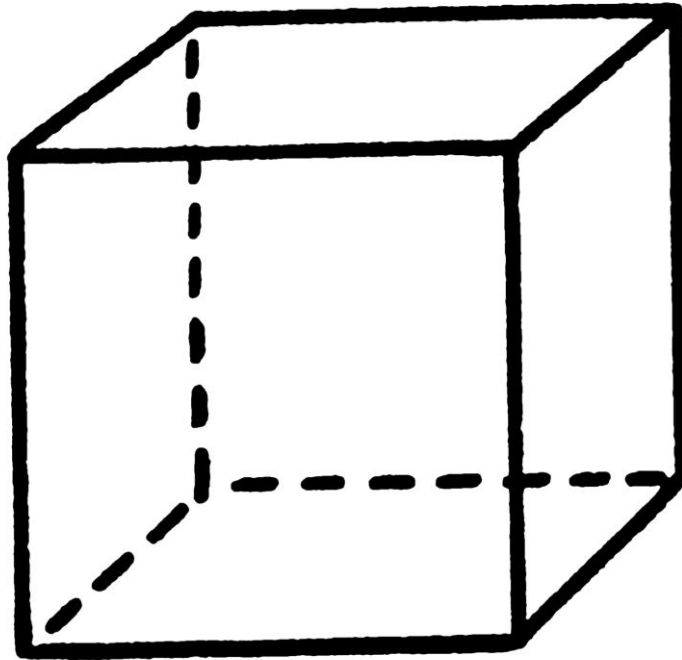
Answer 5:

1. In two dimensions utilities/libraries, Forming image is done using the simple two dimensional geometrical entities (line, points, polygons) the libraries usually contains two types of functions:

- Low level functions to rasterizing the 2D entities in FB
- High-level function to form three dimensions object images using 2D primitives

In such applications/libraries, it's the responsibility of graphics creator to form three dimensional images using the two dimensions primitives

Answer 5:

1. In two dimensions utilities/libraries. Forming image is done using the simple two dimensional geom   ) the libraries usually contains two types of f

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In such applications/lib   ics creator to form three dimensional ima   ves
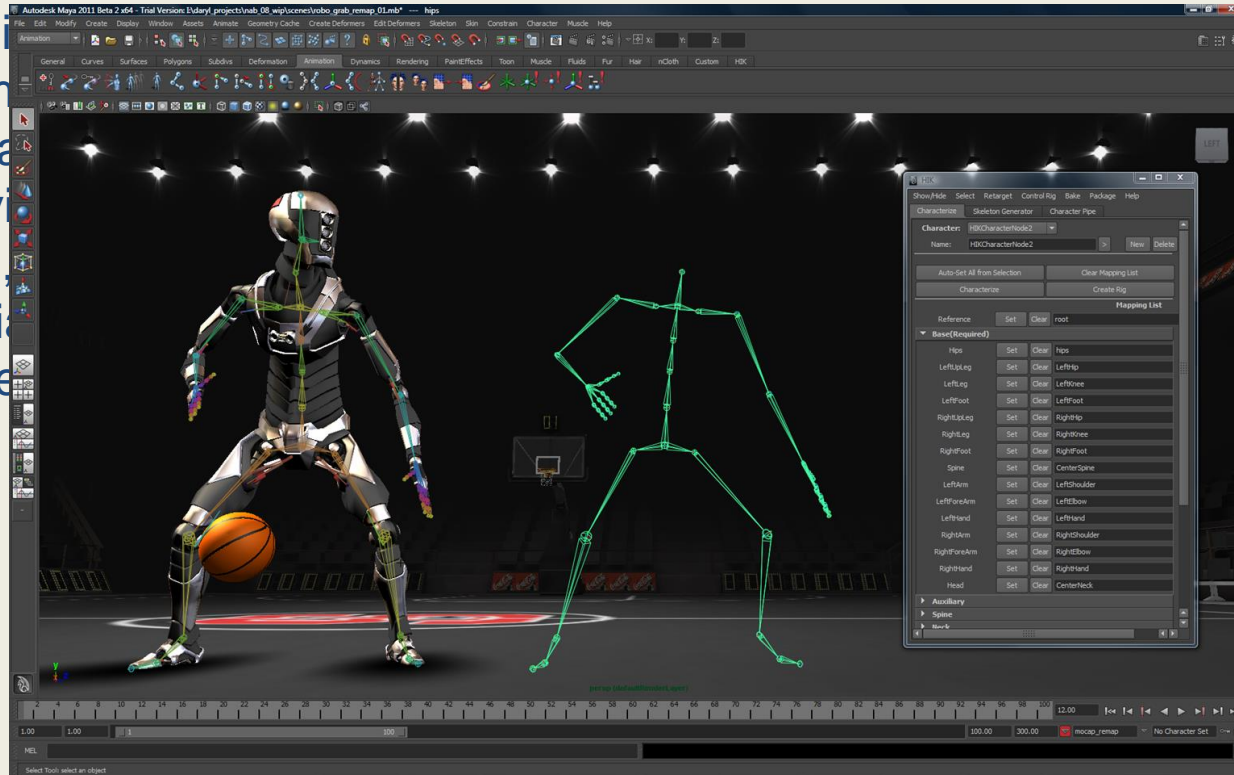
Answer 5:

In 3D graphics utilities/libraries, Generating images is done through using a model for image generation that imitates optical imaging systems (cameras and human visual system)

1) Specifying what exists in the scene, where the light sources(s) is(are) located, what is the nature of the scene materials, etc.
2) A special software (graphics library) and hardware (GPU) cooperates to produce the scene according to your specification by applying the imaging model

Answer 5:

In 3D graphi... ...ing a
model for im... ...eras and
human visua...

1) Specifyi... ...are)
   located,...
2) A specia... ...tes to
   produce... ...imaging
   model

Thanks a lot